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The effect of early necrectomy on the evolution of burns in experimental conditions.

by M. A. Tsukerman and Ya. I. Veksler (Rostov on Don).

Unknown. pp 61-62. (USSR).

In order to learn the expediency of necrectomy in 3rd and 4th degree burns, and the effect of it on the evolution of a burn, and also to establish the most effective time for surgical intervention, experiments were conducted on five series of rabbits of both sexes (a total of 42 animals). The animals of the first series were the control. In the subsequent series of tests necrectomy was performed on the 3rd, 5th, 7th and 9th days after the burns. The burn was inflicted with the flame of a bartel' lamp. The burn covered 10-11 % of the animal's entire body area.

Of the 11 animals in the control series, 9 died from the burns. In the surviving rabbits the average healing time of the burn amounted to 125 days. With the necrectomy on the 3rd day the average healing time was 110 days. All of the rabbits which were operated on during the 5th day survived; the healing of their burns required an average of 50 days. With the operation on the 7th and 9th day, the burn's healing time was 60 and 91 days respectively.

In the control animals the temperatural reaction after the burn was characterized by two rises: the first occurred on the 3-7th day after the burn; the second occurred on the 22-25th day and did not return to normal until the animal's death. With necrectomy, either both crests of the rises were markedly less expressed, or only one rise occurred, which ended with normalization. The continuance of the temperatural reaction is least when the operation is performed on the 5-7th day. The largest loss of body weight was observed in the control animals (600 g), whereas, with the necrectomy on the 5-7th day, this loss constituted 300-320 g. The effect of the necrectomy was substantially told in the degree of continuance of the leukocytic reaction. In all of the cases of early necrectomy, in contrast to the control animals, there was either no second rise of leukocytosis in the late periods of the illness, or the rise was mildly expressed. Normalization occurred more quickly when the operation was performed on the 5th day, concluding, on the average, on the 21st day after the burn. The surgical intervention itself, regardless of the time element, was shown in the first 24-48 hours by a sharp increase in the leukocytosis, frequently lasting over a period of 48-72 hours.

In the control series there was a progressive decrease of the hemoglobin content and erythrocytic count, while in the animals which had been operated on, the changes on the part of the red blood were expressed to a lesser degree. In the animals which were subjected to the operation on the 5th day, the erythrocyte sedimentation reaction was accelerated three times its norm, returning after a month to its original indicator, while in the control animals it was accelerated on an average of 14 times, remaining in high figures until the death of the rabbits. As to the degree of septicotoxemia, there was noted a decrease of the relative volume of plasma, which firmly persisted over a course

of 1½-2 months. In the necrectory cases, particularly those of the 5-7th-day category, during the entire period of the observations the hematocrit showed no deviations from the original amounts.

In the control series disorders of the gaseous metabolism were characterized by clearly expressed stages: an increase of the total oxygen consumption in the first days after the burn was replaced by a phase of reduction. At the same time there also occurred qualitative changes of the exchange processes with a perversion of the respiratory quotient. The operation prevented, to a known degree, the development of acute disorders of the oxidizing processes, particularly during the late stages of the burn.

The favorable effect of early necrectomy on burns is shown also by the dynamics of the sugar content in the blood and the glycemic curves at various times after the burns. With a necrectomy a phase of reduction of sugar in the blood was not observed, or after a stage of hyperglycemia a decrease of the sugar content occurred, but with a relatively quick return to its original level. The sugar curve acquired rudimentary form, but the period of the assimilability quotient's reduction was of shorter duration, or did not occur.

Upon investigation of the syndrome of tissue permeability, there was noted a clear normalizing action of the necrectomy on the permeability of the vessels, which was increased as a result of the burn; in the animals which were operated on during the 5th and 7th days, the rise of the hydrophilous capacity was insignificant; the quotient of stain spread within the skin (according to the trypan-blue test) was increased to only twice the norm; impairments in the extraction of congo red from the vascular canal were less notable and were eliminated more quickly (according to the congo-red index); the normalization of the capillaroscopic picture took place faster. With the surgical intervention the stability (fragility) of the capillary wall also suffered less: increased fragility of the capillaries (according to the Nesterov method), even in the late periods of the burn, was seldom detected, and and the hemorrhagic syndrome was insignificantly expressed.

The biological activity of the animals' blood during the burn was investigated on the isolated heart of a frog. The necrectomy prevented the development of the stage of negative inotropic action, and the stimulation period was also significantly curtailed.

These observations showed that a necrectomy operation is expedient in 3rd and 4th degree burns. It tells favorably on the evolution of the burn, while contributing to the normalization of the pathologic processes which break out in the organism. It proves to be more effective, according to our data, on the 5-7th day after the burn. The surgical intervention itself is an acute additional trauma and therefore must be combined with the conduct of a series of therapeutic measures.

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